

Advanced Algebra - Function Operations
Assignment # _____

Name _____

1. A boutique prices merchandise by adding 80% to its cost. It later decreases by 25% the price of items that don't sell quickly.

- Write a function $f(x)$ to represent the price after the 80% markup.
- Write a function $g(x)$ to represent the price after the 25% markdown.
- Use a composition function to find the price of an item after both price adjustments that originally costs the boutique \$150.
- Does the order in which the adjustments are applied make a difference. Explain.

Let $f(x) = 4x - 1$, $g(x) = 2x^2 + 3$ and $h(x) = 3x + 4$. Perform each function operation.

2. $f(x) + g(x)$

3. $f(x) - g(x)$

4. $f(x) \cdot g(x)$

5. $\frac{f(x)}{g(x)}$

6. $g(x) - f(x)$

7. $\frac{h(x)}{f(x)}$

8. $(f + h)(x)$

9. $(g - h)(x)$

10. $(f \cdot h)(x)$

11. $2f(x) + 3h(x)$

12. $5g(x) - 4$

13. $4(h - f)(x)$

Let $f(x) = -3x + 2$, $g(x) = \frac{1}{2}x$, $h(x) = 2x^2 + 9$, and $j(x) = 5 - x$. Find each value or expression.

14. $f(5)$

15. $h(3)$

16. $f(h(2))$

17. $j(f(-1))$

18. $(f \circ g)(10)$

19. $(f \circ h)(-1)$

20. $(h \circ f)(-1)$

21. $(j \circ f)(2)$

22. $3g(-12) - 4(j(x))$

Let $f(x) = 2x + 9$ and $g(x) = 4x$. Perform each function operation.

23. $(f \circ g)(x)$

24. $(g \circ f)(x)$

25. A department store has marked down its merchandise by 25%. It later decreases by \$5 the price of items that have not sold.

- Write a function $f(x)$ to represent the price after the 25% markdown.
- Write a function $g(x)$ to represent the price after the \$5 markdown.
- Use a composition function to find the price of a \$50 item after both price adjustments.
- Does the order in which the adjustments are applied make a difference. Explain.

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Name Key

1. A boutique prices merchandise by adding 80% to its cost. It later decreases by 25% the price of items that don't sell quickly.

- a. Write a function $f(x)$ to represent the price after the 80% markup.

$$f(x) = 1.8x$$

- b. Write a function $g(x)$ to represent the price after the 25% markdown.

$$g(x) = .75x$$

- c. Use a composition function to find the price of an item after both price adjustments that originally costs the boutique \$150.

$$(g \circ f)(x) = g(f(x)) = .75(1.8x) \Rightarrow .75(1.8(150)) = 202.50$$

- d. Does the order in which the adjustments are applied make a difference. Explain.

Let $f(x) = 4x - 1$, $g(x) = 2x^2 + 3$ and $h(x) = 3x + 4$. Perform each function operation.

2. $f(x) + g(x)$

$$(4x-1) + (2x^2+3) \\ 2x^2 + 4x + 2$$

3. $f(x) - g(x)$

$$4x-1 - (2x^2+3) \\ -2x^2 + 4x - 4$$

4. $f(x) \cdot g(x)$

$$(4x-1)(2x^2+3) \\ 8x^3 - 2x^2 + 12x - 3$$

5. $\frac{f(x)}{g(x)}$

$$\frac{4x-1}{2x^2+3} \text{ no restriction}$$

6. $g(x) - f(x)$

$$2x^2+3 - (4x-1) \\ 2x^2+3 - 4x+1 \\ 2x^2 - 4x + 4$$

7. $\frac{h(x)}{f(x)} = \frac{3x+4}{4x-1}$

$$x \neq \frac{1}{4}$$

8. $(f+h)(x)$

$$4x-1 + 3x+4 \\ 7x+3$$

9. $(g-h)(x)$

$$2x^2+3 - (3x+4) \\ 2x^2 - 3x - 1$$

10. $(f \cdot h)(x)$

$$12x^2 + 13x - 4$$

11. $2f(x) + 3h(x)$

$$17x+10$$

12. $5g(x) - 4$

$$10x^2 + 15 - 4$$

$$10x^2 + 11$$

13. $4(h-f)(x)$

$$-4x + 20$$

Let $f(x) = -3x + 2$, $g(x) = \frac{1}{2}x$, $h(x) = 2x^2 + 9$, and $j(x) = 5 - x$. Find each value or expression.

14. $f(5)$

$$\begin{aligned} & -3(5) + 2 \\ & -15 + 2 \\ & \textcircled{-13} \end{aligned}$$

15. $h(3)$

$$\begin{aligned} & 2(3)^2 + 9 \\ & \textcircled{27} \end{aligned}$$

16. $f(h(2))$

$$\begin{aligned} & -3(2x^2 + 2) + 2 \\ & -3(17) + 2 \\ & \textcircled{-49} \end{aligned}$$

17. $j(f(-1))$

$$\begin{aligned} & 5 - (-3(-1) + 2) \\ & 0 \end{aligned}$$

18. $(f \circ g)(10)$

$$\begin{aligned} & -3\left(\frac{1}{2}(10)\right) + 2 \\ & \textcircled{-13} \end{aligned}$$

19. $(f \circ h)(-1)$

$$\begin{aligned} & 2(-1)^2 + 9 \\ & -3(11) + 2 \\ & \textcircled{-31} \end{aligned}$$

20. $(h \circ f)(-1)$

$$\begin{aligned} & -3(-1) + 2 \\ & 2(5)^2 + 9 \\ & \textcircled{59} \end{aligned}$$

21. $(j \circ f)(2)$

$$5 - -4 = \textcircled{9}$$

22. $3g(-12) - 4(j(x))$

$$\begin{aligned} & 3(-6) - 4 \\ & -18 - 4(5 - x) \\ & -18 - 20 + 4x \\ & \textcircled{-38 + 4x} \end{aligned}$$

Let $f(x) = 2x + 9$ and $g(x) = 4x$. Perform each function operation.

23. $(f \circ g)(x)$

$$\begin{aligned} & 2(4x) + 9 \\ & 8x + 9 \end{aligned}$$

24. $(g \circ f)(x)$

$$\begin{aligned} & 4(2x + 9) \\ & 8x + 36 \end{aligned}$$

25. A department store has marked down its merchandise by 25%. It later decreases by \$5 the price of items that have not sold.

a. Write a function $f(x)$ to represent the price after the 25% markdown. $f(x) = .75x$

b. Write a function $g(x)$ to represent the price after the \$5 markdown. $g(x) = x - 5$

c. Use a composition function to find the price of a \$50 item after both price adjustments. $(g \circ f)(x) = .75x - 5$ $.75(50) - 5 = 32.50$

$(f \circ g)(x) = .75(x - 5) = .75(50 - 5) = .75(45) = 33.75$

d. Does the order in which the adjustments are applied make a difference. Explain.

yes because in the 1st situation you are sub. after mult.